

CLIMATOLOGICAL DATA FOR MARCH, 1913.

DISTRICT NO. 4, THE LAKE REGION.

Prof. HENRY J. COX, District Editor.

GENERAL SUMMARY.

The predominating features of the weather in the Lake region during the month of March, 1913, were the prolonged period of abnormally heavy precipitation from the 23d to the 27th over eastern and southern sections of the district, and the unusually severe and frequent storms which were general over the district during the latter half of the month. These storms resulted in widespread and damaging floods and destructive gales and caused great loss of property and some loss of life. On the 21st one of the most severe wind storms on record swept the lower Lake region. This disturbance was followed by another of exceptional severity on the 23d and 24th, in the wake of which a trough of low barometric pressure of slow movement developed, causing a continuation of heavy rain over Indiana, Ohio, Pennsylvania, and New York from the 23d to the 27th, and giving in some localities a total rainfall for the five days of over 10 inches. This almost unprecedented precipitation, falling upon ground saturated from the rains of previous storms, caused disastrous floods in New York, Ohio, and Indiana, the greatest in the histories of the two States last named. During this period of rain and flood over eastern and southern sections of the district the northern portions of the lake region were visited by snow and sleet. Over northern New York a sleet storm occurred on the 25th-27th which is said to have been the severest storm of that nature ever experienced in that portion of the State. A detailed account of this storm as well as excerpts from the reports of the various observers in the district regarding flood and storm conditions are given on the following pages.

The following table summarizes the main features of meteorological interest in the various portions of the district:

March, 1913.

Portions of States.	Mean temperature.	Departure.	Mean daily range.	Mean precipitation.	Departure.	Greatest precipitation in 24 hours.	Mean snowfall.	Number of days—			Prevailing wind direction.
								With 0.01 or more.	Clear.	Partly cloudy.	
Minnesota.....	17.3	-5.9	16.7	2.18	+0.58	0.79	21.6	12	12	8	11 ne. sw.
Wisconsin.....	25.8	-2.5	17.6	3.19	+1.27	3.12	11.3	10	12	8	11 s. sw.
Illinois.....	35.2	+0.8	17.1	3.44	+0.89	1.37	7.0	15	4	12	15 s. sw.
Indiana.....	35.2	-3.0	19.8	5.96	+3.14	3.39	9.7	14	11	9	11 s. sw.
Upper Michigan.....	19.6	-3.2	17.4	3.05	+1.35	1.53	20.4	11	11	7	13 nw.
Lower Michigan.....	30.6	-0.3	17.9	3.51	+1.19	2.20	9.9	11	9	10	12 sw.
Ohio.....	37.3	+0.3	18.8	9.19	+6.35	4.75	9.0	13	12	8	11 sw.
Pennsylvania.....	37.8	+4.7	18.5	7.36	+4.70	3.06	12.6	17	6	10	15 s.
New York.....	34.0	+3.7	18.6	5.39	+2.40	3.41	10.7	15	7	10	14 sw.
Vermont.....	33.3	+5.8	19.8	5.75	+3.21	2.21	8.5	15	7	8	16 s.

Despite the frequency of storm movement, the percentage of possible sunshine for the month over the lower Lake region was high, while over upper Michigan, northern Wisconsin, and northern Minnesota there was a deficiency. The average hourly wind velocity for the month at nearly all stations was generally in excess of the normal, as was also the mean daily range of temperature, which at some stations averaged 20°.

TEMPERATURE.

For the month as a whole the temperature averaged above the normal over that portion of the district from central lower Michigan eastward, the departure reaching +6.0° or more in portions of New York and Vermont. In Wisconsin, upper Michigan, and Minnesota the month averaged colder than usual, a departure of -7.1° being reported from Duluth, Minn. At this station the mean temperature of -11° on the 2d was the lowest on record there for any day in the month of March. The coldest period occurred in all sections during the first seven days, and minima of -39° and -30° were recorded at Humboldt, Mich., and Highland Falls, Wis., respectively, on the 4th. These readings established new low temperature records for the month of March in their respective localities. Over Illinois and Indiana this cold period also brought record-breaking temperatures, and at Chicago the minimum of -4° on the 2d was the lowest of the present winter and also the lowest on record for March since 1873. Over the eastern half of the district the cold was not unusually severe, although temperatures of zero and below were experienced generally.

From the 9th to the 15th, inclusive, the temperature averaged above the normal, and markedly so over the eastern sections where the daily departures from the normal in some instances exceeded 30°. In Ohio, on the 14th, a maximum of 75° was reported from 4 stations. This period of warmth continued without interruption of consequence over eastern portions until the 25th, and high temperatures for the season were again recorded on the 20th and 21st. Over western sections, especially in Minnesota, the cold weather, aside from the general period of warmth from the 9th to the 15th, was broken only by short intervals with temperature averaging above the normal.

PRECIPITATION.

Precipitation for the month of March was above the normal in all portions of the Lake region, and over much of the district the monthly excess was more than 2 inches. In Ohio, Indiana, and New York the precipitation at practically all stations was the heaviest on record for any March, and at many of these points the greatest on record for any month. At no station in the Ohio section did the

total amount fall below 7.50 inches, and in a few instances it exceeded 12 inches. Over northern and extreme western sections the precipitation was mostly in the form of snow and was well distributed; in the remaining portions of the district, however, it occurred mostly in the form of rain, and although well distributed as to time, it fell chiefly on the 5 days from the 23d to the 27th, inclusive. During this period the rainfall was almost continuous over eastern Indiana, Ohio, Pennsylvania, and portions of New York, and during much of the time fell at an excessive rate. At some stations the daily amounts were over an inch on each of the 5 days. In Ohio the area of heaviest precipitation extended across the State from southwest to northeast and followed closely the boundary line between the Lake Erie and the Ohio River watersheds. The following are some of the heaviest 5-day rainfalls in that State: Upper Sandusky, 10.41 inches; Bucyrus, 9.75; Hudson, 9.65; Oberlin, 9.33; and Medina, 9.18 inches. In the Lake drainage area of New York the storms of the 24th-27th gave from 4 to 5 inches of rain at nearly all stations.

The number of days on which 0.01 inch or more of precipitation occurred was greater than usual, and in New York the average of 15 such days exceeded all March records for the past 15 years.

Snow.—Over the western Lake Superior region, upper Michigan and northern Wisconsin, the snowfall for March was considerably above the normal, amounting to an excess of 18.5 inches at Duluth, Minn. At Houghton, Mich., the total monthly snowfall of 30.6 inches was with the exception of 35.4 inches for the same month in 1904, the heaviest on record for March. In New York and Vermont the snowfall was remarkably light, nearly all occurring within the first 4 days of the month, although in the Adirondack region of the former State, a heavy fall ranging from 6 to 12 inches was recorded at many stations on the 9th. Elsewhere throughout the district nearly normal amounts of snow fell.

At the end of the month no snow was reported on the ground in the district, except in the northwest portion; and over eastern and southern sections, the snow covering had practically disappeared by the middle of the month. At Houghton, Mich., the depth remaining on the ground on the 31st was 31 inches, the greatest previous record for the same date being 25.4 inches in 1901.

ICE.

Until about the middle of the month, the ice in the harbors of all the Great Lakes remained firm, but during the storm of the 14th-15th, the greater part of the ice in the harbors of the lower Lakes and in the Detroit and St. Clair Rivers was broken up, and by the 20th of the month had almost entirely disappeared. Over northern Lake Michigan, the Straits of Mackinac, and Lake Superior the harbors were ice bound until the closing days of the month and at Sault Ste. Marie, Mich., the maximum thickness of the ice in St. Marys River for the winter, 21 inches, occurred on the 24th.

By the end of the month, in Lakes Huron, Erie, and Ontario, the ice fields were confined to the extreme eastern portions of the respective lakes. In Lake Michigan the ice was limited to the east shore from Pentwater northward to the Straits, while in Lake Superior the fields were still extensive but drifting with the wind, nearly all harbors being covered with ice, and the thickness in some

places exceeding 20 inches, with a maximum thickness of 32 inches at Duluth, Minn.

In comparison with the same period last year there was less ice in all the lakes.

RIVERS AND FLOODS.

Destructive floods occurred during the latter half of March in all the rivers in the eastern and southern sections of the district. These floods were the most damaging experienced in recent years and were caused by the heavy rainfall occurring from the 23d to the 27th, previously discussed. In Indiana and Ohio, the Maumee and the Sandusky Rivers and their tributaries reached heights above all previous records. The following table shows the river gage readings in feet and tenths at points on the Sandusky River in Ohio.

Station.	Flood stage.	Highest, 1913.	Previous highest.
Upper Sandusky.....	13.0	19.0	16.0, 1883
Tiffin.....	7.0	18.4	11.4, 1904
Fremont.....	10.0	21.5	16.5, 1904

In western and northern New York the floods were also the most disastrous in many years, and much loss was occasioned from flooded basements, and the washing away of bridges and railroad tracks. In the rivers of northern Vermont flood stages were reached from the 25th to the 30th, and as a consequence, railroad traffic was suspended, and highways and bridges throughout the State were greatly damaged. At Rochester, N. Y., several business streets in the heart of the city were submerged and damage to the extent of thousands of dollars was done as a result of the overflow of the Genesee River from the 27th to the 29th. All records for high water were broken during this flood.

Below are given detailed accounts of the floods in Michigan and Indiana and the damage resulting therefrom:

Michigan.—The Saginaw River: Mild weather beginning on March 9 and continuing during the next week resulted in rapidly melting the snow on the ground which ranged from 4 to 8 inches in depth over most of the watershed and considerably more around the head waters of the Tittabawassee. This caused a rise in all tributaries. On the 12th warnings were issued for a flood stage at Midland by the night of the 13th, and this stage was reached during the afternoon of that date. During the next three days the rise was quite rapid at all points and on the 14th warnings were issued for a flood stage at Vassar and Saginaw by the afternoon or night of the 15th, and for a 20-foot stage at Saginaw by the afternoon of the 16th. At 5 p. m., March 15, the reading was 19.7 at Saginaw. During the next 24 hours the rise at Saginaw was unusually rapid, in view of all the conditions, probably because of a strong south wind and the formation of an ice jam below the city at the interurban bridge. Warning was issued that the flood crest would pass Saginaw by the night of the 17th with a stage not exceeding 22.5. The rise Sunday afternoon and night was considerably slower, and the crest passed Monday, the highest reading being 21.4 feet. The river then fell slowly until the 24th, when rain averaging in depth from one-half inch to 1 inch occurred. Warnings were again issued for a flood stage at Saginaw and Midland, and the crest of this secondary rise reached Saginaw as predicted on the night of the 26th, with a reading of 19.7 feet. During these floods many basements along the east side of the river were flooded, in some instances to a depth of 2 to 3 feet. However, ample warnings were issued so that goods in storage were removed, and the value of stock thus removed or protected as a result of these timely warnings was estimated at from \$50,000 to \$75,000.—F. H. COLEMAN, Local Forecaster, Saginaw, Mich.

Indiana.—The Maumee River: The heavy rain of the 23d caused the rivers of this city to rise rapidly and a stage of 19.6 feet was reached in the Maumee by the morning of the 24th. By that night the Maumee

had reached a stage as high as had ever been recorded since the river station was established seven years ago, and the heavy rain of that night continued to augment the flood which had then reached threatening proportions. By the morning of the 25th the Maumee had reached the 24-foot stage, and large portions of the city, including what is known as the Bloomingdale, Nebraska, and Spy Run sections, were under water.

The Maumee River is formed at Fort Wayne by the St. Marys which comes from the south and the St. Joseph which comes from the north. The flood here was largely due to the great volume of water which was carried by the St. Marys River, as that stream heads south of the city where the rainfall was much heavier than it was over the headwaters of the St. Joseph River.

By the morning of the 24th it was seen that the dike which was built to protect that portion of the city known as Lakeside would not hold, and all residents of that portion who had not already vacated were ordered out, and before noon Lakeside was under water. The Maumee continued to rise until the night of the 26th when a stage of 26.1 feet was registered by the gage on the Columbia Street Bridge; this, however, was not a very accurate reading of the height of the water, as the breaking of the Lakeside Dike caused a large volume of the water of the river to pass through Lakeside rather than under the Columbia Street Bridge.

While several thousand were rendered temporarily homeless by the flood in this city, only six lives were lost as a direct result of the high water. The property loss to the city is hard to estimate at the present time, yet it is probable that the loss will not amount to more than \$1,000,000, possibly much less than that figure. The greatest loss was to the thousand or more houses which were under water, and to furniture therein, much of which could not be removed in time to be saved.—W. S. PALMER, Local Forecaster, Fort Wayne, Ind.

STORMS.

Aside from the general rain storm of the 23d-27th which resulted in the floods described above, several other storms of marked severity passed over the district during the month. On the 21st one of the most destructive wind storms in recent years swept the lower Lake region, as stated before, and maximum wind velocities of 90, 86, and 84 miles per hour were reported from Buffalo, N. Y.; Detroit, Mich.; and Toledo, Ohio, respectively. At the latter station an extreme velocity of 100 miles an hour was recorded, this being the highest velocity for any one minute, while maximum velocities are based upon five-minute periods. Concerning this storm, the officials at Detroit, Mich., and Columbus, Ohio, report as follows:

Detroit, Mich.—A gale of unprecedented severity swept over southern Michigan on March 21. Buildings were razed, roofs blown off, chimneys toppled over, signs and sign boards blown down, trees broken and uprooted, overhead wires prostrated, and several lives lost as a result of the storm's fury. The total wind movement from midnight of the 20th to midnight of the 21st was 884 miles, with an hourly movement of 71 miles, 10 a. m. to 11 a. m., which with the velocity of 86 miles per hour, established the maximum record since the establishment of this station in 1871. Five deaths and scores of injured, many seriously, were reported in this vicinity, and property damage in the city is conservatively estimated at \$500,000, with damages in the southern part of the State correspondingly as great. The river front was greatly damaged and the water strewn with floating débris. Telephone, telegraph, power, and trolley lines were prostrated and the wireless tower at West Grand Boulevard and the river was wrecked.

Columbus, Ohio.—Much damage was done throughout the northern part of the State by the high southwest wind of the 21st. At Cleveland the wind reached a maximum velocity of 64 miles an hour. Reports of extensive damage to trees, telephone and telegraph poles, roofs, and chimneys were received from many of the observers in the State. In Toledo several people were injured and property damaged to the extent of \$15,000 to \$20,000. In Cleveland the damage was estimated at \$80,000. Many oil derricks were blown over in western Ohio.

Severe winds occurred at Duluth, Minn., on the 1st, 13th-14th-15th, and the 23d-24th, accompanied by snow, the maximum velocity being 54 miles an hour from the northwest on the 1st. On the 23d-24th a severe wind storm caused much damage in Chicago and Milwaukee, and in the western suburbs of the former city houses were overturned and roofs blown off.

MISCELLANEOUS.

An unusually large number of thunderstorms for the season occurred during the month, and every station reported at least one such storm, except Duluth, Minn., Grand Rapids, Mich., reporting six. The dates on which thunderstorms were recorded throughout the district were as follows: 9th, 13th, 14th, 15th, 20th, 21st, 23d, 24th, 30th, and 31st. Fog occurred with less frequency than usual, many stations observing none at all.

MARCH LAKE LEVELS.

The following data are from the report of the United States Lake Survey:

	Lake Superior.	Lakes Michigan and Huron.	Lake Erie.	Lake Ontario.
	Feet.	Feet.	Feet.	Feet.
Above tidewater at New York.....	601.54	580.16	572.44	246.71
Above or below:				
Stage of February, 1913.....	-0.07	+0.20	+0.05	-0.04
Stage of March, 1912.....	+0.11	+0.88	+1.21	+1.61
Mean stage of March last 10 years.....	-0.16	+0.03	+0.68	+0.91
Highest recorded stage.....	-0.74	-2.79	-1.25	-1.10
Lowest recorded stage.....	+0.88	+1.05	+1.56	+2.41
Probable change during April.....	0.00	+0.30	+0.60	+0.60

THE SLEET STORM IN NORTHERN NEW YORK, MARCH 25-27.

W. J. BENNETT, Local Forecaster, Canton, N. Y.

The sleet storm of March 25-27 is said to have been the worst storm of the character that has ever visited this locality. It affected a considerable area, covering the counties of St. Lawrence, Jefferson, Lewis, Franklin, and Clinton, N. Y., but the greatest damage was done in St. Lawrence County.

The weather maps of March 24-27 show rather peculiar conditions. A trough of low pressure extended from Texas to Michigan on the 24th, which drifted eastward to the Atlantic coast by the 27th. Meanwhile, several distinct centers of low pressure formed in the southwest, and moved northeastward along the trough. Temperatures were abnormally high to the east and abnormally low to the west, and temperature differences between places not far apart were in some cases very great. The precipitation area extended much farther to the west of the trough than to the east, and this was rather an unusual condition.

The above facts seem to indicate that there was a general and continuous movement of a great volume of warm, moist air from the southeast, upward and northwestward over the colder surface air coming from the northwest, and this caused an inversion of the vertical temperature gradient over a wide belt to the west of the trough. The upward moving and expanding air cooled slowly, as it was constantly receiving heat from the condensation of moisture. The cold air from the northwest warmed slowly, and where the surface temperatures were above freezing, rain fell. When the upward current had cooled to freezing and temperatures near the surface had also reached this point, the precipitation took the form of snow. Over northern New York, the surface temperature fell to freezing long before the upward current had cooled to that point, and the rain that fell froze upon all objects near the earth's surface. In connection with the long continuance of these conditions, the southern end of the

TABLE 1.—Climatological data for March, 1913. District No. 4, Lake Region.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Sky.	Prevailing wind direction.	Observers.			
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of partly cloudy days.	Number of cloudy days.			
<i>Minnesota.</i>																					
Cloquet.	Carlton.	800	2	16.4	- 7.1	50	29†	- 32	7	48	2.47	+ 1.70	0.60	18.3	10	10	11	10	ne.	State Forest Exp. Sta.	
Duluth.	St. Louis.	1,133	42	17.0	- 7.1	48	31	- 25	2	33	3.25	- 0.19	0.79	29.1	18	8	8	15	ne.	U. S. Weather Bureau.	
Floodwood.	do.	1,257	6	15.2	-	45	11†	- 31	7	56	2.53	- 0.11	0.35	25.2	15	18	5	8	n.	M. H. Schussler.	
Stephens Mine.	do.	1,500	6	15.2	-	51	29†	- 23	2	45	1.17	- 0.11	0.30	20.0	8	10	9	12	ne.	Oliver Iron Mining Co.	
Two Harbors.	Lake.	614	19	21.9	- 3.6	51	29†	- 29	2	48	1.48	+ 0.15	0.26	15.2	11	15	6	10	nw.	G. W. Watts.	
Virginia.	St. Louis.	1,434	19	15.8	- 6.9	48	29†	- 29	2	48	1.48	+ 0.15	0.26	15.2	11	15	6	10	nw.	Oliver Iron Mining Co.	
<i>Wisconsin.</i>																					
Appleton.	Outagamie.	795	12	27.6	- 2.9	58	30	- 12	2	32	5.35	+ 3.22	3.12	10.8	14	15	5	11	s.	Wm. O. Thiede.	
Ashland.	Ashland.	615	22	19.5*	- 4.2	51*	29	- 24*	4	56*	1.34	- 0.19	0.38	14.4	11	10	5	16	ne.	Agr. Exper. Station.	
Bayfield.	Bayfield.	635	4	19.7*	-	49*	30	- 25*	4	46*	1.50	-	1.40	11.0	11	9	13	7	nw.	F. Kern.	
Cecil.	Shawano.	804	15	25.8	- 1.3	58	29	- 24	6	44	3.42	+ 1.73	1.53	11.0	11	9	15	7	sw.	Louis W. Schmidt.	
Cornucopia.	Bayfield.	640	1	21.2	- 4.7	51	19†	- 28	7	50	3.50	+ 1.98	3.00	6.0	6	13	8	10	s.	Reed Fruit Co.	
Crandon.	Forest.	1,060	18	21.2	- 4.7	51	19†	- 28	7	50	3.50	+ 1.98	3.00	6.0	6	15	3	13	nw.	Frank Shoemaker.	
Florence.	Florence.	1,293	22	20.3	- 3.6	49	19†	- 25	4	50	3.57	+ 1.52	1.03	20.0	6	15	7	13	s.	Fred S. Evans.	
Fond du Lac.	Fond du Lac.	800	27	28.6	- 2.4	62	30	- 15	7	38	3.13	+ 1.08	0.86	11.0	11	21	3	7	nw.	Edward A. Seeley.	
Grand River Locks.	Marquette.	770	17	28.8	-	62	30	- 15	7	36	2.69	+ 0.41	0.75	6.0	9	14	3	14	nw.	Jerry Parkinson.	
Green Bay.	Brown.	617	27	26.2	- 0.6	59	30	- 10	7	34	3.03	+ 0.63	0.88	8.9	13	4	9	18	s.	U. S. Weather Bureau.	
High Falls.	Marinette.	1,125	1	23.0	-	55	30†	- 30	4	58	3.21	-	1.38	7.7	10	15	8	8	nw.	No. Hydro-Elec. Pow. Co.	
Iron River.	Bayfield.	1,006	4	19.2	-	49	29	- 27	2	53	3.10	-	1.50	29.6	8	21	5	5	w.	Winfield E. Tripp.	
Keweenaw.	Keweenaw.	590	4	25.9	-	53	29	- 11	7	32	2.31	-	0.57	11.7	7	11	7	13	s.	Capt. N. Craite.	
Manitowoc.	Manitowoc.	616	62	27.2	- 2.1	53	30†	- 9	2	39	3.64	+ 1.41	1.26	11.8	9	4	13	14	s.	Miss Johanna Lups.	
Menasha.	Winnebago.	764	16	24.7	-	58	30†	- 8	7†	36	2.31	+ 0.68	1.08	10.5	12	15	7	9	nw.	Geo. T. Allanson.	
Menomonee Falls.	Waupaca.	842	4	29.4	-	58	30†	- 8	7†	36	2.31	+ 0.78	1.23	6.2	13	5	9	9	s.	Arthur H. Christman.	
Milwaukee.	Milwaukee.	681	43	31.9	+ 1.0	61	19	- 6	2	31	3.09	+ 0.42	1.11	5.4	14	8	13	10	sw.	U. S. Weather Bureau.	
New London.	Outagamie.	762	17	26.6	- 2.3	59	30	- 18	7	38	4.32	+ 1.94	1.50	9.0	8	5	7	19	sw.	August H. Pape.	
Oconto.	Oconto.	590	22	26.0	- 3.2	55	30†	- 11	7	36	3.26	+ 1.11	0.80	16.5	10	9	16	6	s.	Wm. K. Smith.	
Oshkosh.	Winnebago.	744	24	26.8	- 3.7	60	30	- 15	2	38	1.06	-	1.10	7.0	5	14	8	9	sw.	Evan Vincent.	
Pine River.	Waushara.	900	18	27.4*	- 1.9	63†	30	- 15 ^b	2	32 ^b	3.97	+ 2.16	1.63	8.7	10	3	20	8	sw.	Geo. H. Carpenter.	
Plum Island.	Door.	588	5	24.7	-	49	24	- 13	7	36	2.88	-	0.57	15.6	13	14	2	15	nw.	Wm. Robinson.	
Plymouth.	Sheboygan.	843	3	28.0	-	60	30	- 11	2	29	3.11	-	0.97	9.5	13	10	11	10	s.	Paul O. Feldrap.	
Port Washington.	Ozaukee.	713	20	29.9	- 1.5	65	18	- 8	2	38	4.69	+ 1.87	1.62	10.5	9	7	7	17	nw.	Richard C. Kann.	
Racine.	Racine.	633	16	31.8	- 2.6	62	19	- 5	2	29	2.54	-	0.08	8.0	13	15	2	14	sw.	Daniel Davis.	
Ripon.	Fond du Lac.	1,031	3	28.1	-	60	30	- 14	2	33	3.48	-	1.10	13.8	13	6	13	12	w.	Ripon College.	
Sheboygan.	Sheboygan.	831	14	29.0	- 4.0	59	31	- 17	2	40	3.18	+ 0.90	1.36	7.0	7	12	11	8	nw.	Louis C. Meyer.	
Sturgeon Bay.	Door.	600	14	25.0	- 2.0	56	30	- 15	7	32	3.49	-	0.94	6.0	9	8	13	10	sw.	Adam N. Dier.	
Superior.	Douglas.	701	4	17.6	-	51	31	- 22	2	52	1.69	-	0.60	14.5	16	9	13	9	sw.	Edward B. Banks.	
Waupaca.	Waupaca.	857	18	26.1	- 2.9	61	30†	- 20	7	40	4.30	+ 2.22	1.73	16.5	10	12	10	9	sw.	James H. Flagg.	
<i>Illinois.</i>																					
Chicago.	Cook.	823	43	35.2	+ 0.8	65	24	- 4	2	33	3.44	+ 0.89	1.37	7.0	15	4	12	15	s.	U. S. Weather Bureau.	
<i>Indiana.</i>																					
Auburn.	Dekalb.	874	17	32.4*	- 4.7	70*	14	- 5 ^c	8	46*	6.71	+ 4.17	3.39	14	12 ^e	1 ^e	13 ^e	13 ^e	nw.	Mrs. Josie B. Kuhlman.	
Berne.	Adams.	849	4	37.6	-	70	14	1	2	35	9.74	-	2.56	10.6	18	11	12	8	sw.	Henry M. Reusser.	
Fort Wayne.	Allen.	856	17	36.2	- 2.7	70	14	0	2	38	7.10	+ 3.50	2.76	12.6	13	9	9	sw.	U. S. Weather Bureau.		
Hammond.	Lake.	598	22	35.4	- 1.7	63	19	0	7	39	4.37	+ 1.76	1.80	18.0	12	8	8	15	s.	Carson W. Whitney.	
Howe.	Lagrange.	886	8	34.6	-	68	24	- 3	2	34	3.99	-	1.43	10.2	18	11	10	10	sw.	James E. Zook.	
Notre Dame.	St. Joseph.	712	2	34.6	-	68	24	- 3	2	34	3.99	-	1.43	10.2	18	11	10	10	sw.	U. S. Weather Bureau.	
Whiting.	Lake.	606	4	34.8	-	65	19	- 4	2	30	3.82	-	1.24	6.7	12	6	14	11	sw.	D. H. Boyd.	
<i>Michigan—Upper Peninsula.</i>																					
Baraga.	Baraga.	623	11	16.6	- 7.2	53 ^d	20	- 14 ^d	16 ^d	46 ^d	2.22	-	0.81	8	10	0	21	w.	D., S. S. & A. Ry.		
Bergland.	Ontonagon.	1,300	3	16.9	-	55	19†	- 40	4†	66	2.22	-	1.54	0.80	30.0	15	10	5	16	w.	Frank McMonigal.
Calumet.	Houghton.	1,246	25	18.4	- 3.9	45	19	- 16	6	39	3.12	+ 1.54	0.80	30.5	7	11	3	17	n.	E. S. Grierson.	
Chatham.	Alger.	875	12	21.8	- 2.1	50	27	- 20	5	52	0.90	- 0.68	0.20	8.5	7	11	3	17	n.	Upper Peninsula Exp. Sta.	
Deer Park.	Luce.	610	12	20.5	- 4.8	48	19†	- 15	6	36	1.00	- 0.59	0.80	10.0	3	9	1	21	s.	Mrs. Sarah E. McGaw.	
Detour.	Chippewa.	585	12	21.2	- 3.3	44	30	- 9	4	36	2.30	+ 0.53	0.60	16.5	13	14	4	13	nw.	John Jones, Jr.	
Eagle Harbor.	Keweenaw.	622	14	20.9	- 2.6	45	29	- 24	7	41	3.39	+ 1.44	1.06	14.1	15	9	4	18	s.	John Nolan.	
Escanaba.	Delta.	612	40	20.9	- 2.6	50	29	- 20	3	41	3.39	+ 1.44	1.06	14.1	15	9	4	18	s.	U. S. Weather Bureau.	
Ewen.	Ontonagon.	1,147	12	16.9	- 5.1	48	19	- 36	4	61	3.68	+ 2.13	0.60	31.5	13	6	5	20	sw.	W. B. Hatfield.	
Grand Marais.	Alger.	610	12	21.2	- 3.3	44	30	- 9	4	36	2.30	+ 0.53	0.60	16.5	13	14	4	13	nw.	Mrs. Lena Truedell.	
Green.	Ontonagon.	622	2	18.4	- 3.9	51	19	- 19	4	40	3.39	+ 1.29	1.53	30.6	15	11	8	12	w.	T. A. Green.	
Houghton.	Houghton.	668	12	18.4	- 3.9	51	19	- 19	4	40	3.39	+ 1.29	1.53	30.6	15	11	8	12	w.	U. S. Weather Bureau.	
Humboldt.	Marquette.	1,536	16	16.8	- 2.6	50	20	- 39	4	64	1.70	+ 0.47	0.60	17.0	6	2	17	w.	D., S. S. & A. Ry.		
Iron Mountain.	Dickinson.	1,111	12	23.0	- 3.0	51	29	- 20	4	47	2.85	+ 1.23	0.95	16.5	7	20	7	4	nw.	Chapin Mining Co	

TABLE 1.—Climatological data for March, 1913. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Sky.	Prevailing wind direction.	Observers.	
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Number of rainy days, 0.01 inch or more.	Number of part. cloudy days.	Number of cloudy days.		
<i>Michigan—Lower Peninsula—Contd.</i>																			
Arbela.	Tuscola.	728	17	29.7	-2.1	66	14	-11	7	35	3.82	+1.30	1.04	10.0	8	0	13	18	w.
Battle Creek.	Calhoun.	822	29	33.4	+0.1	68	14	-2	7	31	3.71	+1.42	0.85	10.0	10	10	8	13	sw.
Bay City.	Bay.	593	17	29.6	-2.5	62	17	-5	7	50	5.2	+5.24	1.30	41.0	15	3	18	10	3
Benzonia.	Benzie.	832	16	26.6	-1.5	56	14	-3	4	45	7.53	+5.24	1.30	14.3	14	2	14	15	sw.
Berlin.	St. Clair.	24	31.3	+0.6	68	20	-7	5	54	6.03	+3.88	1.12	14.3	14	2	10	8	sw.	
Big Rapids.	Mecosta.	906	17	28.6	-1.0	61	24	-8	5	55	3.69	+0.70	1.05	1.59	8	3	20	8	sw.
Blissfield.	Lenawee.	687	1	35.4	.....	69	14	-6	7	33	5.83	.....	1.59	7.8	11	8	6	17	sw.
Bloomington.	Van Buren.	9	33.3	.....	65	24	-3	41	37	2.40	.....	0.70	5.5	8	16	4	11	sw.	
Cadillac.	Wexford.	1,293	4	25.8	.....	58	24	-12	7	37	3.52	.....	0.87	9.6	8	6	11	14	s.
Cassopolis.	Cass.	903	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlevoix.	Charlevoix.	610	35	22.4	-4.0	60	30	-26	4	51	.....	.....	.....	.....	10	5	10	.....	.....
Charlotte.	Eaton.	9	32.2	.....	69	24	2	3	32	2.37	.....	1.00	11.0	5	12	8	11	w.	
Chesapeake.	Cheboygan.	611	23	23.0	-2.5	58	30	-16	4	43	1.75	-0.04	1.00	6.0	3	4	20	7	sw.
Clinton.	Lenawee.	830	23	35.2	-0.6	70	14	-8	7	42	4.98	+2.70	1.11	10.1	12	13	11	7	sw.
Coldwater.	Branch.	984	16	34.2	-2.1	68	14	-1	21	40	4.56	+2.07	1.02	12.5	14	12	9	10	s.
Croton.	Newaygo.	685	5	30.8	.....	63	14	-7	7	33	6.52	.....	2.20	14.0	10	1	23	7	sw.
Detroit.	Wayne.	730	42	33.7	+0.8	68	14	2	7	35	5.63	+3.26	1.37	13.0	18	10	11	10	sw.
Durand.	Shiawassee.	799	5	.....	.....	.....	.....	3	7	37	.....	.....	.....	.....	.....	.....	.....	.....
East Tawas.	Iosco.	590	16	27.6	-2.1	54	20	-11	7	37	1.11	-1.26	0.50	5	17	10	3	3	sw.
Eloise.	Wayne.	640	16	34.6	-1.2	68	14	-2	7	32	5.05	+2.36	1.10	11.4	11	13	9	9	w.
Flint.	Genesee.	730	24	32.4	+1.5	67	14	6	7	36	3.11	+1.17	0.90	10.0	15	9	13	9	w.
Frankfort.	Benzie.	589	9	26.6	.....	58	14	-18	5	46	4.95	.....	1.55	24.0	11	9	0	22	s.
Ganges.	Allegan.	665	4	33.1	.....	65	14	6	7	33	3.04	.....	0.97	12.2	13	7	7	17	sw.
Gaylord.	Otsego.	1,367	13	24.3	-2.2	57	30	-10	7	41	3.73	+2.54	1.00	8	9	0	22	sw.	
Gladwin.	Gladwin.	794	17	29.2	+0.9	65	14	-12	7	43	2.72	+0.49	2.10	2.5	5	21	8	8	sw.
Grand Haven.	Ottawa.	628	42	31.4	+0.6	63	14	5	7	29	3.12	+0.61	1.25	11.5	19	8	10	13	s.
Grand Rapids.	Kent.	707	24	32.8	-0.2	67	14	4	5	33	3.57	+1.05	0.90	9.6	16	5	14	12	w.
Grape.	Monroe.	625	23	35.1	-0.2	69	14	-7	7	33	6.24	+4.05	1.88	10.0	12	11	15	6	w.
Grass Lake.	Jackson.	989	7	32.2	.....	67	14	0	5	40	3.47	.....	1.10	3.0	8	17	1	13	sw.
Grayling.	Crawford.	1,147	23	25.6	+0.4	60	30	-15	7	41	4.26	+2.37	1.76	8.5	15	10	5	16	w.
Greenville.	Montcalm.	802	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harbor Beach.	Huron.	635	25	31.3	+1.9	64	19	-5	7	34	2.10	+0.56	1.00	11.0	4	12	12	7	s.
Harrison.	Clare.	1,159	20	28.2	+1.6	62	14	11	7	48	1.48	-0.40	0.60	10.0	3	16	6	9	nw.
Harrisville.	Alcona.	616	29	27.0	+0.0	58	24	-11	7	39	3.52	+0.97	1.60	2.8	12	11	10	10	sw.
Hart.	Oceana.	698	21	.....	.....	.....	.....	3	5	30	2.66	+0.65	0.80	20.0	9	11	12	10	sw.
Hayes.	Huron.	620	23	30.8	+0.8	66	14	-9	7	36	1.09	-0.88	0.40	4.0	3	11	9	9	sw.
Highland.	Oakland.	1,006	21	.....	.....	.....	.....	.....	.....	.....	4.08	+1.68	1.21	8.0	6	1	1	1	sw.
Hillsdale.	Hillsdale.	1,150	16	33.2	-1.1	68	14	-2	2	35	4.96	+2.68	1.25	11.2	14	10	8	13	sw.
Holland.	Ottawa.	610	7	32.0	.....	64	19	4	7	35	2.62	.....	0.90	6.5	15	10	11	10	sw.
Houghton Lake.	Roscommon.	0	27.7	.....	61	14	-8	7	38	2.44	.....	0.95	0.7	7	14	6	11	6	sw.
Howell.	Livingston.	924	21	32.1 ^b	+0.5	67 ^b	14	-8 ^b	7	31 ^b	2.88	+0.80	1.62	5.6	12	10	11	10	sw.
Ivan.	Kalkaska.	24	24.9	-1.7	60	24	-20	7	48	3.63	+1.76	1.66	8.5	10	5	17	9	nw.	
Jackson.	Jackson.	927	16	33.9	-1.4	63	14	-5	7	32	3.77	+1.20	1.02	11.0	11	17	9	5	s.
Jeddo.	St. Clair.	667	24	31.0	+0.6	65	14	8	7	41	3.89	+2.03	1.04	13.3	12	9	10	12	sw.
Johannesburg.	Otsego.	0	24.2	.....	60	30	-15	7	43	3.45	.....	2.00	2.0	6	7	18	6	s.	
Kalamazoo.	Kalamazoo.	955	37	31.6	-1.2	65	13	1	7	35	2.65	+0.29	0.95	9.5	8	11	9	w.	
Lansing (Agr. College).	Ingham.	803	49	31.0	-1.3	67	14	-10	7	36	3.76	+1.50	1.42	13.9	20	6	15	10	sw.
Lansing (Capitol).	do.	881	26	32.3	+0.3	68	14	-5	7	42	3.85	+1.59	1.30	11.2	16	8	9	14	sw.
Lapeer.	Grand Traverse.	827	14	32.6	-1.6	68	14	5	7	35	4.15	+2.49	1.65	10.5	10	2	23	6	nw.
Ludington.	Mason.	637	15	29.5	-2.1	59	14	3	14	34	3.47	+1.56	0.99	10.7	16	5	8	18	s.
Luther.	Lake.	1,023	3	27.4	.....	60	14	-15	5	43	3.89	.....	0.94	18.5	13	9	8	14	w.
Mackinaw.	Cheboygan.	592	22	25.5	+1.8	65	20	0	17	48	.....	.....	.....	.....	12a	11	5	5	s.
Mancelona.	Antrim.	1,121	17	26.0	-1.2	61	31	-18	7	53	1.20	-0.33	0.40	12.0	5	11	0	20	u.
Manistee.	Manistee.	600	16	29.7	-0.2	68	19	-5	5	42	2.40	+0.37	1.00	14.0	5	3	3	20	sw.
Marshall.	Calhoun.	806	1	.....	.....	.....	.....	.....	.....	.....	3.24	+0.83	1.00	.....	8	6	5	20	s.
Midland.	Midland.	604	14	33.1	+0.2	66	14	-9	7	42	.....	.....	.....	.....	14	4	13	sw.	
Morenci.	Lenawee.	811	6	36.0	.....	70	14	-6	5	39	6.80	.....	1.52	12.0	13	10	10	11	sw.
Mount Clemens.	Macomb.	615	13	34.5	+1.7	74	20	-6	5	58	3.83	+2.16	1.06	8.2	13	17	0	14	w.
Mount Pleasant.	Isabella.	826	14	27.0	-3.1	60	31	-1	6	35	.....	.....	.....	.....	13	13	5	13	w.
Muskegon.	Muskegon.	587	17	32.1	+0.1	65	14	4	7	31	3.90	+1.80	1.00	11.0	14	5	16	10	sw.
Old Mission.	Grand Traverse.	858	23	26.6	-0.3	58	30	-8	4	37	3.99	+1.87	1.26	7.4	11	7	12	12	sw.
Olivet.	Eaton.	934	23	32.3	0.0	64	15	-2	7	42	2.93	+0.39	1.44	6.9	15	10	5	16	s.
Omer.	Arenac.	616	14	34.2	-4.2	60	31	-14	7	39	3.99	-1.05	0.30	15.0	15	7	15	9	sw.
Onaway.	Presque Isle.	826	10	23.5	-4.2	60	31	-14	7	39	4.23	+1.77	1.50	15.0	15	7	15	9	sw.
Owosso.	Shiawassee.	731	16	35.6	+3.4	69	14	5	5	46	3.23	-1.07	0.22	54	6	14	8	9	w.
Petoskey.	Emmet.	660	23	25.4	-1.2	64	30	-11	4	47	3.89	-1.07	0.22	54	7	16	5	10	sw.
Plymouth.	Wayne.	725	16	39.0	-4.2	70	14	8	7	39	4.12	+2.00	1.15	1.5	1	1	1	1	sw.
Pontiac.	Oakland.	935	13	31.8	+1.2	65	14	-7	7	30	3.76	+1.78	1.00	9.5	11	8	15	8	sw.
Port Austin.	Huron.	618																	

TABLE 1.—Climatological data for March, 1913. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Sky.	Prevailing wind direction.	Observers.			
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmailed.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of partly cloudy days.	Number of cloudy days.			
<i>Ohio—Continued.</i>																					
Findlay.....	Hancock.....	776	24	38.5 ^b	+ 1.0	74 ^b	14	1 ^b	2 ^b	38 ^b	8.67	+ 5.93	2.80	10.7	13	6	8	sw.	Dr. E. A. Moser.		
Fremont.....	Sandusky.....	628	11	38.4	- 2.2	73	14	1 ^b	7	40 ^b	8.24	+ 5.34	2.88	6.3	10	18	1	12	sw.	E. Stanley Thomas.	
Hedges.....	Paulding.....	725	19	37.1 ^a	- 1.2	71	14	—	3	8	40	+ 5.73	3.00	11.0	13	11	11	9	sw.	Charles Stutzman.	
Hillhouse.....	Lake.....	997	20	36.2 + 1.5	72	14	1	3	8	40	8.50	+ 5.29	3.76	8.0	12	11	6	14	sw.	J. W. Doncaster.	
Hiram.....	Portage.....	1,260	33	37.0 + 3.1	71	14	1	7	33	8.54	+ 6.61	4.10	7.0	13	12	5	14	nw.	Prof. G. H. Colton.		
Hudson.....	Summit.....	1,123	52	38.6 + 2.1	75	14	0	7	38	10.82	+ 7.64	4.10	7.0	13	12	5	14	nw.	Dr. W. I. Chamberlain..		
Lima.....	Allen.....	875	14	38.4 - 2.6	70	14	2	2	32	10.01	+ 6.61	3.35	6.0	10	9	13	9	s.	Miss Ollie De Long.		
Medina.....	Medina.....	944	25	37.7 + 0.4	74	14	0	7	35	10.36	+ 7.32	3.30	8.0	12	15	2	14	s.	F. W. Clark.		
Montpelier.....	Williams.....	880	21	35.5 + 0.3	70	14	—	2	24 ^b	7.65	+ 4.76	1.85	6.3	13	5	10	10	w.	G. L. Laser.		
Napoleon.....	Henry.....	680	26	34.8 - 3.2	70	14	1	6	39	—	—	2.57	10.0	18	1	12	12	w.	A. C. Senter.		
New Bremen.....	Auglaize.....	1,038	20	38.8 + 1.6	71	14	1	2	33	9.93	+ 6.64	3.22	4.2	15	6	10	10	sw.	Miss Lillian Grothaus.		
North Royalton.....	Cuyahoga.....	1,000	20	36.3 - 0.3	71	14	0	7	33	9.03	+ 5.97	3.43	13.0	12	5	8	8	sw.	W. S. Edgerton.		
Norwalk.....	Huron.....	719	27	38.8 - 1.2	75	14	2	7	34	10.70	+ 7.70	2.93	10.0	11	3	14	14	w.	Giles R. Gregory.		
Oberlin.....	Lorain.....	855	38	38.0 + 2.2	73	14	1	7	33	10.38	+ 8.07	3.15	8.9	16	5	10	10	sw.	Prof. F. F. Jewett.		
Ottawa.....	Putnam.....	720	20	38.2 - 0.5	72	19	1	2 ^b	36	8.33	+ 5.36	2.71	9.2	10	8	12	11	sw.	Prof. J. T. Maidlow.		
Sandusky.....	Erie.....	629	36	37.2 + 2.0	72	14	3	7	34	8.69	+ 6.14	2.96	11.5	18	8	7	16	sw.	U. S. Weather Bureau.		
Tiffin.....	Seneca.....	775	31	38.1 + 0.8	70	20	3	7	34	10.23	+ 7.07	3.65	10.2	14	11	12	8	w.	Prof. T. H. Sonnedecker.		
Toledo.....	Lucas.....	769	42	36.1 + 1.3	69	14	2	7	34	7.99	+ 5.71	2.69	13.3	13	11	7	7	sw.	U. S. Weather Bureau.		
Upper Sandusky.....	Wyandot.....	854	30	38.5 + 1.0	71	14	2	7	32	12.29	+ 9.07	3.50	9.0	12	6	15	10	s.	Robert E. Tracht.		
Vickery.....	Sandusky.....	588	20	36.8 - 0.5	71	14 ^b	—	5	38	8.21	+ 5.57	2.41	4.7	13	9	12	10	s.	John W. Barr.		
Wapakoneta.....	Auglaize.....	898	1	37.4	—	68	14	3	2	32	10.10	—	3.29	10.5	8	15	8	s.	Dr. William Kayser.		
Wauseon.....	Fulton.....	780	41	34.7 + 0.2	70	14	—	4	7	35	7.93	+ 4.51	2.55	15.5	18	4	16	11	s.	Thomas Mikesell.	
Wickliffe.....	Lake.....	740	1	—	—	—	—	—	—	8.26	—	2.71	—	12	9	6	16	s.	C. M. Richardson.		
<i>Pennsylvania.</i>																					
Erie.....	Erie.....	658	40	37.8 + 4.7	73	14	5	7	38	7.36	+ 4.70	3.06	12.6	17	6	10	15	s.	U. S. Weather Bureau.		
<i>New York.</i>																					
Adams Center.....	Jefferson.....	540	22	34.1 + 4.8	72	21	—	8	7	41	5.53	+ 1.86	0.80	20.0	13	8	12	11	se.	A. E. Cooley.	
Angelica.....	Allegany.....	1,340	30	35.5 + 4.7	67	21	—	2	8	38	6.29	+ 3.38	2.78	5.0	12	2	8	21	se.	Charles P. Arnold.	
Appleton.....	Niagara.....	270	22	35.6 + 2.9	72	14	—	2	8	39	3.91	+ 1.90	1.40	5.6	16	4	13	14	sw.	H. A. van Wagoner.	
Auburn.....	Cayuga.....	715	44	37.2 + 4.2	70	21	—	2	8	38	5.24	+ 2.83	2.25	13.0	12	12	13	6	s.	A. H. Underwood.	
Avon.....	Livingston.....	585	18	36.8 + 2.8	69	14 ^b	—	3	8	44	4.44	+ 2.54	1.78	5.0	11	6	16	9	sw.	W. G. Markham.	
Brockport.....	Monroe.....	537	17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	sw.	W. H. Lennon.		
Buffalo.....	Erie.....	767	62	34.8 + 3.6	70	14	—	1	7	38	3.60	+ 0.98	1.21	13.5	18	8	12	11	sw.	U. S. Weather Bureau.	
Canton.....	St. Lawrence.....	448	19	31.8 + 4.1	71	21	—	8	7	37	5.24	+ 2.40	1.18	11.5	14	6	8	17	sw.	Do.	
Cape Vincent.....	Jefferson.....	246	8	31.6	—	64	22	—	5	7	40	4.51	—	1.15	—	7	6	18	s.	J. Harry Grapotte.	
Chazy.....	Clinton.....	151	13	32.0 + 3.8	64	21	—	7	8	34	4.13	+ 2.88	0.90	7.0	10	9	7	15	sw.	W. R. North.	
Chestnut Lawn.....	Wyoming.....	1,090	1	36.2	—	70	20	0	7	46	5.88	—	2.19	5.5	16	7	15	9	s.	Charles Peterson.	
Danemora.....	Clinton.....	1,490	8	31.4	—	63	22	—	9	7	40	3.09	—	0.55	16.4	14	6	14	sw.	Dr. W. N. Thayer.	
Elba.....	Genesee.....	500	14	33.7 + 2.1	69	14	—	5	7	46	6.04	+ 3.11	1.48	13.0	11	14	4	13	sw.	Joseph S. Wilford.	
Fayetteville.....	Onondaga.....	530	12	37.5 + 2.8	70	21	0	5	7	40	5.42	+ 2.52	2.52	7.5	19	7	12	12	se.	Dana H. Wells.	
Gabriels.....	Franklin.....	1,729	11	30.6	—	74	21	—	9	8	40	7.34	—	2.00	9.2	19	9	15	sw.	Gabriel Sanitarium.	
Harkness.....	Clinton.....	622	11	33.6 + 3.8	66	21	—	7	8	36	3.81	+ 2.13	1.07	6.0	12	6	9	9	w.	J. W. Harkness.	
Hemlock Lake.....	Livingston.....	900	15	35.6 + 2.6	66	21	0	0	8	37	4.96	+ 3.03	4.5	13	12	10	9	9	sw.	Bernard P. McGrady.	
Hunt.....	do.....	1,321	14	37.2 + 3.0	72	14 ^b	—	1	7	46	5.93	+ 3.20	2.50	4.0	9	7	12	12	sw.	W. S. Barager.	
Ithaca.....	Tompkins.....	925	35	36.8 + 4.9	67	21	4	8	36	3.73	+ 1.29	1.68	2.9	19	11	15	15	s.	U. S. Weather Bureau.		
Keene Valley.....	Essex.....	1,000	15	35.6 + 5.6	74	19	—	9	8	48	5.54	+ 2.63	0.82	2.5	16	11	8	12	s.	E. R. Wells.	
King Ferry.....	Cayuga.....	15	—	—	—	—	—	—	—	—	4.62	+ 2.20	2.08	6.4	14	4	11	16	se.	Lucius A. Goodyear.	
Lake George.....	Warren.....	350	16	—	—	58	30	—	16	8	44	7.90	—	1.78	7.9	13	9	10	12	sw.	Charles Forsell.
Lake Placid Club.....	Essex.....	1,864	5	27.0	—	69	14 ^b	0	7	38	5.79	—	2.10	5.8	16	3	20	8	sw.	Henry van Hoevenberg.	
Lauterbrunnen.....	Wyoming.....	1	36.2	—	69	14 ^b	—	9	5	36	4.73	—	1.13	7.5	7	7	12	12	sw.	James O. Howard.	
Lockport.....	Niagara.....	520	26	35.0 + 1.7	72	14	—	2	8	40	4.22	+ 1.94	1.07	12.5	13	7	12	12	sw.	Robert N. Clark.	
Lowville.....	Lewis.....	900	46	35.0 + 8.1	62	21	—	7	8	40	5.07	+ 2.57	1.45	—	21	—	—	—	w.	Prof. W. F. Breeze.	
Moira.....	Franklin.....	200	13	32.1 + 3.0	72	21	—	8	57	40	6.29	+ 3.02	1.22	32.0	19	4	20	7	sw.	C. E. McBride.	
Nehasane.....	Hamilton.....	1,750	5	29.4	—	64	21	—	20	8	44	7.37	—	1.29	25.8	21	9	11	11	s.	L. W. Brown.
North Lake.....	Herkimer.....	1,822	12	30.7	—	61	21	—	10	7	41	5.93	—	1.19	11.0	14	11	3	17	w.	John F. Redmond.
Ogdensburg.....	St. Lawrence.....	175	29	32.4 + 3.3	71	21	—	7	7	40	5.45	+ 2.90	1.20	12.8	14	5	15	11	sw.	State Hospital.	
Old Forge.....	Herkimer.....	1,733	5	30.6	—	63	21	—	13	8	40	9.21	—	1.70	17.0	20	8	5	18	sw.	Mrs. S. Nelson.
Oswego.....	Cattaraugus.....	334	43	35.5 + 4.1	70	21	2	7	38	4.47	+ 1.63	1.07	14.4	19	4	4	23	s.	U. S. Weather Bureau.		
Otto.....	do.....	410	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	se.	William J. Winke.	
Palermo.....	do.....	460	54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	sw.	E. B. Bartlett.	
Perry City.....	Schuyler.....	1,038	33	34.4 + 3.8	69	21	—	4	8	39	5.18	+ 2.17	1.98	3.9	13	3	6	22	s.	W. H. Jeffers.	
Philadelphia.....	Jefferson.....	485	7	33.8	—	74	21	—	9	5	36	4.73									

TABLE 2.—*Daily precipitation for March, 1913. District No. 4, Lake Region.*

Stations.	Watershed.	Day of month.																														Total			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Minnesota.</i>																																			
Cloquet.	L. Superior.	.06	.08		T.	T.	19		24		42	T.	.04	.52	T.	.04	T.	.03	T.	.03	.06	T.	.27	.50	.04	T.	T.	.03	.20		2.47				
Duluth.	do.	.20	.11		T.	.13		T.	.29		.35	.12	.04	.77	.04	T.	.04	T.	.03	T.	.03	.04	T.	.27	.50	.04	T.	T.	.03	.22		3.26			
Floodwood.	do.																																		
Stephens Mine.	do.	.05	.01	.02		.06																													2.53
Two Harbors.	do.	T.		.05																															1.17
Virginia.	do.					.04		.07																										1.48	
<i>Wisconsin.</i>																																			
Appleton.	Fox.	.02	T.	12		.03			T.																										5.35
Ashland.	L. Superior.	.06	T.	10		.01					T.	15		.38	.03	T.	.04			T.	.10	.03	T.	.33	.05									1.34	
Bayfield.	do.																																		1.50
Cecil.	Fox.	.03	.06																																3.42
Cornucopia.	L. Superior.			.05																															3.50
Crandon.	Fox.																																		3.57
Florence.	Menomonee.																																		3.13
Fond du Lac.	Fox.	T.	T.	T.	T.																														2.69
Grand River Locks.	do.																																		3.03
Green Bay.	Lake Mich.	.01	.09			.02																												3.21	
High Falls.	do.	.05		.07		T.																												3.10	
Iron River.	L. Superior.	.30	.10																																3.10
Keweenaw.	Lake Mich.																																		2.31
Manitowoc.	do.	T.	.08																															3.64	
Menasha.	Fox.	.02	T.																																2.39
Menomonee Falls.	Lake Mich.	.02	.21	.03	.02																													2.31	
Milwaukee.	do.	T.	T.	.08	T.	.01																												3.09	
New London.	Fox.	T.	.08																																4.23
Oconto.	Lake Mich.																																		3.26
Oshkosh.	Fox.	T.																																	2.89
Pine River.	do.	T.	T.	.01		.01																												3.97	
Plum Island.	Lake Mich.	.20	.20	.30		.02																												2.88	
Plymouth.	do.	T.	T.	.01		T.																												3.11	
Port Washington.	do.																																		4.69
Racine.	do.	.02		T.	.16	.02			T.	.05																								2.54	
Ripon.	Fox.	.01		.03		T.																												4.48	
Sheboygan.	Lake Mich.			T.	T.	T.	T.																											3.18	
Sturgeon Bay.	do.																																		3.49
Superior ||.	L. Superior.	.02	.05		.04																													1.69	
Waupaca.	Fox.	T.			.05																													4.30	
<i>Illinois.</i>																																			
Chicago.	Lake Mich.	.02	T.	.09	.09	.12		.02																										3.44	
<i>Indiana.</i>																																			
Auburn ||.	Maumee.	.26	T.		.06		.03	.05	.03																									6.71	
Berne.	do.	.22	.01		.26	.05	.12	T.	.01																								9.74		
Fort Wayne.	do.	.07		.07	.33	.16	T.	.08																									7.10		
Hammond.	Lake Mich.																																		4.37
Howe ||.	St. Joseph.																																		3.99
Notre Dame.	do.	.08	T.		.04	.20	.12	.03																									3.82		
Whiting.	Lake Mich.																																		
<i>Michigan—Upper Peninsula.</i>																																			
Baraga.	L. Superior.	T.	.12	.10		.18	T.			T.																								2.00	
Bergland.	Ontonagon.		.08	T.		.14	T.																											2.22	
Calumet.	L. Superior.																																		3.12
Chattham.	do.																																		0.90
Deer Park.	do.																																		1.00
Detour.	St. Marys.																																		
Eagle Harbor.	L. Superior.																																		
Escanaba.	L. Michigan.	.02	.03	.03		.11	T.																											3.39	
Ewen.	Ontonagon.	.05	.11	.10		.67	T.																											3.68	
Grand Marais.	L. Superior.		.10			.24																													

TABLE 2.—*Daily precipitation for March, 1913. District No. 4—Continued.*

¹ Incomplete record due to flood, etc.

TABLE 2.—*Daily precipitation for March, 1913. District No. 4—Continued.*

Stations.	Watershed.	Day of month.																																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total.									
Ohio—Continued.																																										
Hudson.....	Lake Erie.....	.30	.10	.10	.10	.10	.10																											.27	10.82							
Lima.....	Maumee.....	.30		T.	T.	T.	.10		T.	T.	T.		T.	.45	T.	T.	T.																.50	10.01								
Medina.....	Lake Erie.....	.26			.20		.10																											.28	10.36							
Montpelier.....	Maumee.....	.25		.50		.15		.08	.60																									.45	7.65							
Napoleon.....	do.....																																									
New Bremen.....	do.....	.22		.05		.10																														.08	9.93					
North Royalton.....	Lake Erie.....	.20	.20	.10	.20																															.22	9.03					
Northwalk.....	do.....	.60			.60																																.28	10.70				
Oberlin.....	do.....	.20		.30		.07																														.24	10.38					
Ottawa.....	Maumee.....	T.	.53	.03	.03																																.42	8.33				
Sandusky.....	Lake Erie.....	.28	.03	.31	.01	T.	.01	T.	.02																											.29	8.69					
Tiffin.....	Sandusky.....	.30	.10	.20		.10																															.84	10.23				
Toledo.....	Maumee.....	.20		.11	.39	.12	T.	T.	T.																											.34	7.99					
Upper Sandusky.....	Sandusky.....	.35			.12		.22	T.																													.35	12.29				
Vickery.....	Lake Erie.....	.30		.23	T.	.03	T.																														.28	8.21				
Wapakoneta.....	Maumee.....	.21	.04	.11		.16		.04	T.	T.	.10																									.15	10.10					
Wauseon.....	do.....	.13		.01	.39	.10	.01																														.50	7.93				
Wickliffe I.....	Lake Erie.....	.19			.30	.03	T.	T.																													.29	8.26				
Pennsylvania.																																										
Erie.....	Lake Erie.....	.18	.03	.08	.33		.05		T.	T.	.06	.03		T.	.03	.01	.06																			.18	7.36					
New York.																																										
Adams Center.....	L. Ontario.....	.10	.50	.65	.41	T.	.08																														.48	5.53				
Angelica.....	Genesee.....	.06		T.	.30	T.	.08																														.17	6.29				
Appleton.....	L. Ontario.....	.02	.02	.40	.05		.05	.01	T.	.02																										.08	3.91					
Auburn.....	Oswego.....	.18	.29		.28																																	.04	5.24			
Avon.....	Genesee.....	.26		.12	.22		T.	T.																														.04	4.44			
Brockport.....	L. Ontario.....																																									
Buffalo.....	Lake Erie.....	.20	.02	.26	.14	T.	.05																															.01	3.60			
Canton.....	Grass.....	.29	.09	.29	.02		.08																															.29	5.24			
Cape Vincent.....	St. Lawrence.....	.16	.23	.16			.20																															.45				
Chazy.....	Champlain.....	.20		.10	T.																																	.15	4.13			
Chestnut Lawn.....	Genesee.....	.16	.01	.03	.27	T.	.02	T.	.02																											.21	5.88					
Dannemora.....	Champlain.....	.19		.30	.09																																	.40	3.09			
Elba.....	L. Ontario.....	.30	T.	.30	.20		T.																															.12	6.04			
Fayetteville.....	Oswego.....	.06	T.	.06	.42		.08	.04																													.08	5.42				
Gabriels.....	St. Regis.....	.26	.09	.18	.05		.03																														.35	T. 7.34				
Harkness.....	Lake Champlain.....	.08			.05	.05																																.24	3.81			
Hemlock Lake.....	Genesee.....	.06	T.	*	.20																																	.16	4.96			
Hunt.....	do.....	.10		.30																																		.30	5.93			
Ithaca.....	Oswego.....	T.	.02	.08	.12	.01	T.																														.01	07.37.33				
Keene Valley.....	Ausable.....	.11	T.	.06	.14	T.																																.47	5.54			
King Ferry.....	Oswego.....	.05			.23																																	.02	4.62			
Lake George.....	Lake Champlain.....																																									
Lake Placid Club.....	Ausable.....	.18	.19	.13																																				.50	7.90	
Lauterbrunnen.....	W. B.																																									
Lockport.....	Genesee.....	.18	.02	.01	.27		.02																																.17	5.79		
Lowville.....	L. Ontario.....	.06	T.	.05	.30		.10	.06	T.																													.17	4.22			
Moira.....	Black.....	.16	.04	.47	.15	.02	.09	.03																													.48	5.07				
Nehasane.....	St. Lawrence.....	.30	.10	.20	.10		.30																															.32	6.29			
North Lake.....	Black.....	.20	.24	.23	T.	.10	.02																														.62	T. 7.37				
Old Forge.....	St. Lawrence.....	.20	.12	.50	.16	T.	.20																														.55	5.45				
Palermo.....	Black.....	.15	.07	.79	.32		.20																														.100	9.21				
Perry City.....	Oswego.....	.09		T.	.18	.18	T.	.10	.02																											.17	4.47					
Philadelphia.....	St. Lawrence.....	.17	.11	.15	.04		.09																															.31	4.73			
Potsdam.....	Raquette.....	.18	.20		.12																																		.45	4.90		
Ranger School.....	Oswegatchie.....	.29	.07	.16	.14	T.	.03	.05	T.	.42	T.																									.35	4.74					
Raquette Lake.....	Raquette.....	.22	.04	.43	.29		.10																															.32	8.39			
Rochester.....	Genesee.....	.38	.02	.40	.22	T.	.14	.06	T.	.07																										.08	5.16					
Romulus.....	Oswego.....	.15			.40																																		.T. 4.40			
Scottsville.....	do.....	.01	.05	T.	.05		T.					</td																														

* Precipitation included in that of the next measurement.

Separate dates of falls not recorded.

Precipitation for the 24 hours ending on the morning when it is measured.
Precipitation is less than 0.01 inch rain or melted snow.

1. Precipitation is less than 0.01 inch rain or melted snow.

TABLE 3.—Maximum and minimum temperatures for March, 1913. District No. 4, Lake Region.

Date.	Duluth, Minn.		Wisconsin.				Chicago, Ill.		Fort Wayne, Ind.		Upper Michigan.								Lower Michigan.									
			Florence.		Green Bay.						Escanaba.		Ewen.		Houghton.		Marquette.		Sault Ste. Marie.		Alpena.		Battle Creek.					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
1....	13	—14	16	—15	21	2	23	8	26	17	17	1	19	—28	18	—8	20	0	23	4	23	9	29	16	23	7		
2....	3	—25	14	—7	10	—10	20	—6	22	—4	17	0	12	—12	6	—4	12	—1	17	—2	19	2	22	5	20	1		
3....	6	—2	13	—2	2	15	4	34	20	40	22	43	16	14	0	11	—10	9	—9	11	—3	14	2	18	3	35	4	
4....	19	—1	25	—25	25	20	—5	24	15	30	20	34	16	14	—11	25	—36	20	—19	27	—6	19	—9	27	2	33	16	
5....	28	—5	27	9	30	6	32	13	34	17	37	12	29	26	5	27	1	28	4	26	5	28	1	32	2	27	—7	
6....	10	—13	11	—9	11	—3	14	1	17	6	24	7	8	—3	6	—16	7	—4	6	—4	6	—8	12	—4	31	8	27	—4
7....	13	—7	16	—19	17	—10	23	5	27	10	25	4	12	—9	23	—35	15	—15	19	—4	12	—20	14	—9	23	—2	18	—12
8....	40	13	40	5	40	15	45	23	50	26	48	24	36	1	38	5	32	1	36	11	30	4	37	—3	41	15	37	0
9....	34	22	33	20	38	28	48	30	49	35	50	19	30	19	36	19	30	19	32	19	29	4	32	22	43	32	39	25
10....	41	26	38	20	40	26	36	29	35	30	43	30	35	22	42	23	39	26	43	27	33	0	37	10	40	25	35	9
11....	34	20	40	17	43	28	46	32	45	30	49	31	36	15	40	8	39	19	40	27	38	28	44	25	45	26	41	23
12....	29	26	43	32	53	35	54	34	55	36	58	36	38	29	47	31	38	30	47	32	44	30	41	31	54	29	43	29
13....	30	23	44	32	47	34	54	37	60	46	66	48	38	30	45	29	41	25	44	32	39	34	39	32	63	36	49	37
14....	23	10	39	19	49	24	53	34	63	39	70	42	38	19	32	15	25	15	32	41	19	44	35	68	47	57	41	
15....	17	1	20	10	24	13	34	18	39	24	42	23	19	11	15	1	15	9	15	10	19	4	36	10	49	23	43	14
16....	15	2	17	0	22	8	27	12	31	16	29	—17	19	5	11	—16	12	6	16	5	12	1	21	8	25	19	19	10
17....	25	—1	23	—4	31	5	38	14	43	17	36	13	27	1	25	—27	26	—11	26	2	26	—6	27	6	30	11	24	5
18....	27	22	47	20	50	31	56	33	60	41	61	36	39	24	47	23	32	23	39	26	55	26	57	23	50	22		
19....	29	9	49	35	58	44	61	42	64	44	65	44	41	35	48	27	51	20	53	28	52	42	56	38	63	41	53	41
20....	19	2	47	11	51	17	51	26	56	30	64	38	38	14	37	5	21	8	46	14	56	24	60	35	51	22		
21....	16	4	17	8	26	15	30	17	34	19	58	20	19	12	16	5	19	12	18	13	23	11	44	20	52	23	33	12
22....	24	—1	28	1	24	9	33	14	34	17	38	19	24	7	22	—1	10	28	9	24	9	30	16	33	19	33	11	
23....	26	19	31	18	43	24	57	33	64	34	65	29	34	19	32	14	33	21	32	22	34	20	43	25	48	27	35	20
24....	25	12	33	16	49	21	59	28	65	32	65	49	43	13	32	12	31	13	32	10	48	9	56	23	63	43	58	22
25....	12	8	18	4	22	13	30	25	33	30	49	31	19	9	20	9	16	8	14	6	27	4	23	15	44	26	28	17
26....	24	5	20	7	26	13	29	19	30	26	32	25	26	12	17	—5	16	9	18	12	17	9	27	18	33	26	24	15
27....	24	3	24	4	30	13	31	17	31	22	29	19	26	9	30	—15	23	2	22	10	19	6	25	14	30	18	22	10
28....	41	14	38	5	41	23	44	26	44	28	36	18	34	12	40	0	41	1	38	11	31	5	36	13	36	15	34	17
29....	48	34	49	33	54	37	56	37	57	36	53	34	45	33	46	36	49	37	53	38	45	28	49	30	50	30	50	29
30....	40	31	48	31	59	37	60	42	62	46	60	46	43	31	42	32	48	34	51	27	57	35	60	40	57	35	60	40
31....	48	29	45	30	49	36	53	38	56	44	54	42	44	32	40	26	39	27	41	29	40	28	46	30	56	38	53	31
Mns.	25.3	8.6	30.7	9.9	35.3	17.2	40.5	23.3	43.7	26.6	46.1	26.4	29.0	12.8	29.8	4.0	27.0	9.8	30.2	13.8	29.9	9.9	35.5	16.4	43.5	23.3	36.1	15.5

Date.	Lower Michigan.						Ohio.						Erie, Pa.						New York.						Vermont.			
	Detroit.		Muskegon.		Saginaw, West Side.		Cleveland.		Lima.		Sandusky.		Toledo.		Buffalo.		Canton.		Rochester.		Syracuse.		Burling- ton.		North- field.			
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
1....	28	19	26	15	27	23	30	20	32	20	28	22	28	16	29	20	33	24	41	26	34	18	41	20	37	15	45	
2....	22	4	26	9	20	6	24	7	27	2	24	4	23	3	26	9	23	10	28	5	24	11	28	10	30	15	37	
3....	36	12	32	14	32	7	40	14	42	10	40	17	42	15	36	10	30	10	24	10	30	9	26	10	29	9	39	
4....	25	13	21	9	25	7	32	21	41	23	30	17	26	16	32	21	26	18	17	5	27	19	28	9	24	13	33	
5....	32	7	31	13	30	3	33	14	36	11	34	7	33	5	32	16	28	17	4	32	17	31	15	29	11	33	8	
6....	20	5	26	8	11	1	32	9	37	12	32	7	22	5	32	7	29	4	32	2	31	5	31	6	30	5	30	
7....	18	2	23	4	17	—	6	23	5	20	3	23	2	19	13	5	10	—1	2	8	11	2	10	4	7	—6	13	
8....	39	18	39	17	40	14	47	12	43	22	45	20	42	18	43	7	37	6	29	—3	35	1	32	4	26	—10	27	
9....	46	33	44	32	44	28	52	34	53	39	51	32	49	33	51	31	46	32	42	29	52	32	55	24	56	26	50	26
10....	38	29	40	25	39	24	41	32	43	30	38	30	37	29	36	28	39	30	31	22	37	29	41	28	42	28	42	28
1																												